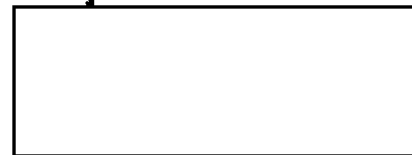


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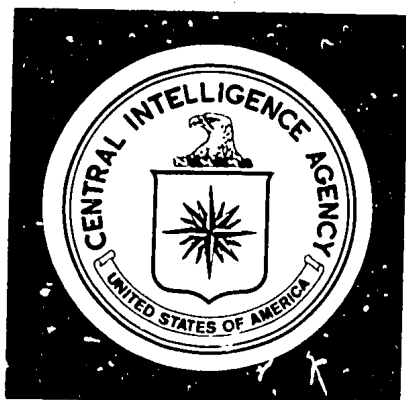
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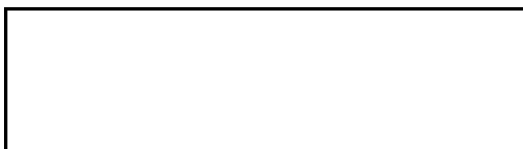


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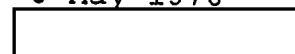
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134
TSWS-18/75
5 May 1975



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WEEKLY SURVEYOR

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USSR AND EASTERN EUROPE

A proposed European Space Agency may enhance the transfer of space technology among member nations. Initial efforts probably will be aimed at competing with the US and Japan in communications satellites.

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The British have achieved a significant technical breakthrough in fabricating very long multifilamentary niobium-tin superconducting wires. The use of these wires rather than others in superconducting motor, magnet, and fusion reactor R&D will result in capabilities to handle higher power densities as well as lower operating costs.

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While the aborted mission on 5 April to put a crew aboard Salyut 4 successfully demonstrated Soviet contingency planning, the procedures carried out were outside the crew's control. The cosmonaut has no capability to initiate an abort or manually override the automatic system.

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CHINA

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The PRC has announced its first hybrid computer, the HMJ-200 model. Although very little information is available regarding hybrid and analog computer developments in the PRC, such computers are believed to be in widespread use, especially by the military.

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OSI-TSWS-18/75

5 May 75

MIDDLE EAST AND ISLAMIC WORLD

Spokesmen for the Pakistani Ministry of Foreign Affairs claim that a second Indian nuclear test is imminent. It is almost certainly true that the Indians contemplate additional tests.

The South Africans announced that early operation of their pilot uranium enrichment plant indicate they will be able to market enriched uranium at one-third less than US price. They expect to have a full scale plant producing 6,000 metric tons of separative work units (SWU) by 1986. Recently South Africa stated that the process used is a high performance walled centrifuge, using uranium hexafluoride in hydrogen as the process fluid.

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NUCLEAR ENERGY

Pakistan Claims Second Indian Nuclear Test Is Imminent:
Spokesmen for the Pakistani Ministry of Foreign Affairs claim that a second Indian nuclear test is imminent. [REDACTED]

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Comment: Statements by Indians about the future of their test program are vague and in part conflicting, but leave little doubt that additional tests are contemplated.

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Some Aspects of South African Uranium Enrichment Process Revealed: South Africa expects to be a world supplier of enriched uranium as well as uranium ore by the late 1980s.

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Earlier this month, South African officials announced that their uranium enrichment pilot plant had gone into operation. It is likely, however, that only part of this plant is actually operating. The South Africans reiterated their confidence that the process will be competitive on the world market.

South Africa's first commercial enrichment plant using the process is scheduled to begin operations in 1984 and will

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OSI-TSWS-18/78
5 May 75

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reach full capacity two years later, according to a South African announcement. The plant's annual production of 5000 tons of separative work could provide core loadings for about fifteen 1,000 megawatt electric power reactors, and would be designed with the capacity to double this production.

To be competitive, the South Africans are projecting a selling price of \$74 per kilogram unit of separative work (SWU) using 6 mil power in 1986. This equates to a cost of about \$27 million for the enrichment for the equivalent of one core loading for a 1,000 megawatt electric power reactor.

To meet this estimate, the South Africans must keep to a minimum both the amount of electricity used in the process and the cost of that electricity. The South Africans have indicated that the amount of electricity needed has been reduced, at least below original estimates. Relatively cheap electric power is available in South Africa today because the country has considerable amounts of inexpensive coal. The coal resources are not inexhaustible, however, and in the future South Africa plans to supplement its own electrical power supply with hydroelectric power from a dam under construction in neighboring Mozambique.

The South Africans could adapt their enrichment process for the production of weapons-grade material. The government claims that it has the capability to build nuclear weapons but says its policy is to use the enriched uranium for peaceful purposes. Pretoria, however, has not signed the Non-Proliferation Treaty.

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SPACE

New European Space Agency Will Enhance Space Technology Transfer:
At a meeting in Brussels on 15 April, ten European countries agreed to scale down their existing national space programs and coordinate their activities under a proposed European Space Agency (ESA). A British director was chosen for the new agency, which is to be headquartered in Paris. The full members of ESA are to be Belgium, Denmark, France, West Germany, Italy, the Netherlands, and the UK. Austria, Norway and Ireland also have decided to participate as observers. A treaty is to be signed in May to formally establish the Agency.

Comment: This arrangement has the potential of enhancing space technology transfer among the member nations. As a consolidation of the European Space Research Organization (ESRO) and the European Launcher Developer Organization (ELDO), ESA will attempt to coordinate the various national space programs, a duty that ESRO did not handle well. The European Space Research and Technology Center, located in the Netherlands, traditionally has been the main research arm of ESRO and is likely to remain in this capacity for ESA.

The ESA hopes to improve the competitiveness of European industry by furthering the development of space technology, apparently through funding, and by encouraging the formation of industrial facilities in space related areas. Initial activity in this area is likely to be directed, in part, towards competition with the US and Japan in satellite communications systems, both space-borne and land-based. Considerable developmental and industrial activity is already under way as a result of operational comsats such as Intelsat, Symphonie (Franco-German) and Skynet (UK) and planned systems, i.e., Orbital Test Satellite (ESRO), Sirio (Italy) and German TV Broadcast Satellite.

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Soviet Cosmonaut Crew Has No Control Over Abort Procedures:
In a news release on the aborted attempt by the Soviets on 5 April to put a crew aboard Salyut 4, Major General Shatalov, Soviet cosmonaut chief, commented on that crew's role in the abort procedures undertaken. He stated that the blasting of the Soyuz free of its rocket, its repositioning for reentry, and its actual return to earth near the Siberian town of Gornoaltaisk had been all outside the crew's control.

Comment: While the aborted mission and subsequent recovery of the cosmonauts successfully demonstrated Soviet contingency planning, the Soviets evidence little confidence in man to carry out abort procedures on his own. The Soviet cosmonaut has no capability to initiate an abort during the launch phase nor can he manually override the automatic system. In contrast, US Apollo design philosophy places the prime responsibility for this activity with the astronauts. Furthermore, the Soviet cosmonauts

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British Achieve Significant Technical Breakthrough in Fabricating Multifilamentary Niobium-Tin Superconductors: Imperial Metals Industries (IMI) in the UK can manufacture multifilamentary niobium-tin on a commercial scale. A typical conductor for sale contains 1500 niobium-tin filaments, each 5 micrometers in diameter, in a 0.5-millimeter diameter bronze wire. Such a conductor can carry a current of 300 A in a magnetic field of 6 tesla (60,000 gauss) and 140 A in a 10-tesla field.

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Comment: IMI, a pioneer in superconducting materials development, has achieved a significant technical breakthrough. The employment of this niobium-tin wire will mean higher power densities in, and lower operating costs for, superconducting motors and generators, which have important naval applications such as propulsion motors one-tenth the size of conventional ones and superior high field magnets which are necessary if power generation by fusion reactors and magnetohydrodynamic generators is to be economically feasible. Although laboratories throughout the world are attempting to fabricate multifilamentary niobium-tin, none has been successful so far in their efforts to produce it in lengths (greater than 1000 meters) and quality sufficient for coil winding.

Niobium-tin can operate at higher temperatures (17° K) and magnetic fields than almost all other known superconducting materials and still retain its superconductive properties. Until now, it could be made only in ribbon or tape form because it is extremely brittle. Ribbons and tapes lack the mechanical rigidity and electromagnetic stability of multifilamentary wire and cannot be made into large magnets. This niobium-tin wire should soon start replacing niobium-titanium wire, the most popular multifilament superconductor in use today.

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Chinese Announce First Hybrid Computer: According to a Chinese news service, the Peking No. 1 radio plant has successfully designed and manufactured the HMJ-200 model "combination modulation" electronic computer, the first of its kind in China. By combining the merits of both "modulation" and digital computers, the computer can be used in scientific research, national defense, automation and other fields. The computer consists of two main machines and 14 auxiliary equipments plus input/output facilities, 80 integrators and 1000 operational amplifiers.

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Comment: The HMJ-200 model computer as described by the Chinese appears to be a hybrid system, the first such computer system to be openly announced by the Chinese. Hybrid computers, which may consist of interconnected analog and digital computers or analog computers with digital logic, have been used for many years in the simulation of dynamic systems particularly those developed for military and space applications. They offer the combination of analog computer speed and digital computer precision and flexibility and can handle system simulation problems far more effectively than digital computers alone. The Chinese system appears to be quite extensive although the number of

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25X1 [redacted] Although practically all computer installations revealed by the Chinese in recent years have been digital machines, it is believed that analog and hybrid computers are still in widespread use, especially in defense-related developments.

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